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CSIR NET - GENERAL APTITUDE

QUANTITATIVE APTITUDE

L-6

Profit-loss,
Simple and compound interest

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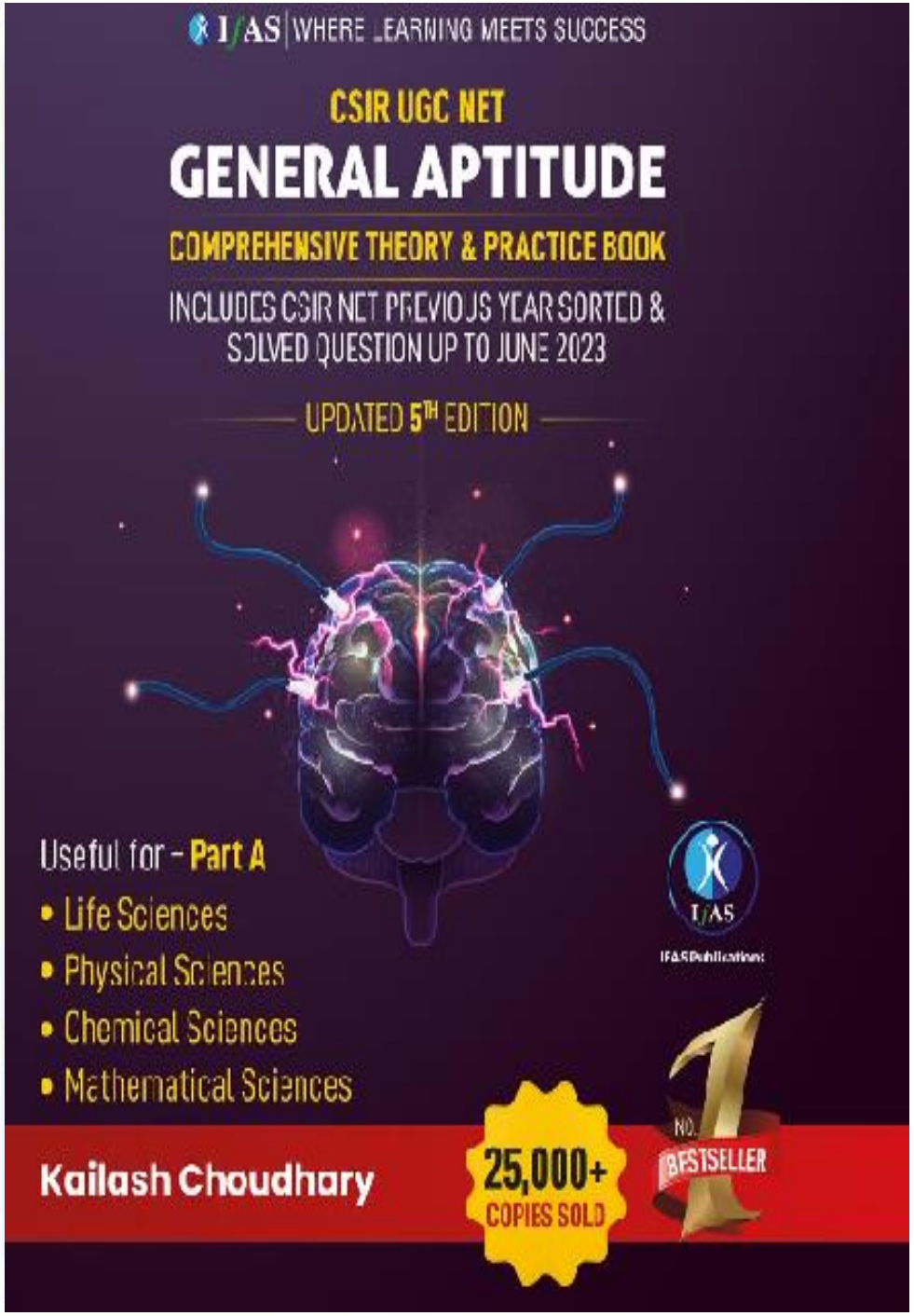
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Topic Covered in Today's Session

1. What is profit and loss?
2. What is successive discount ?
3. What is Simple interest?
4. What is Compound interest ?
5. Practice questions

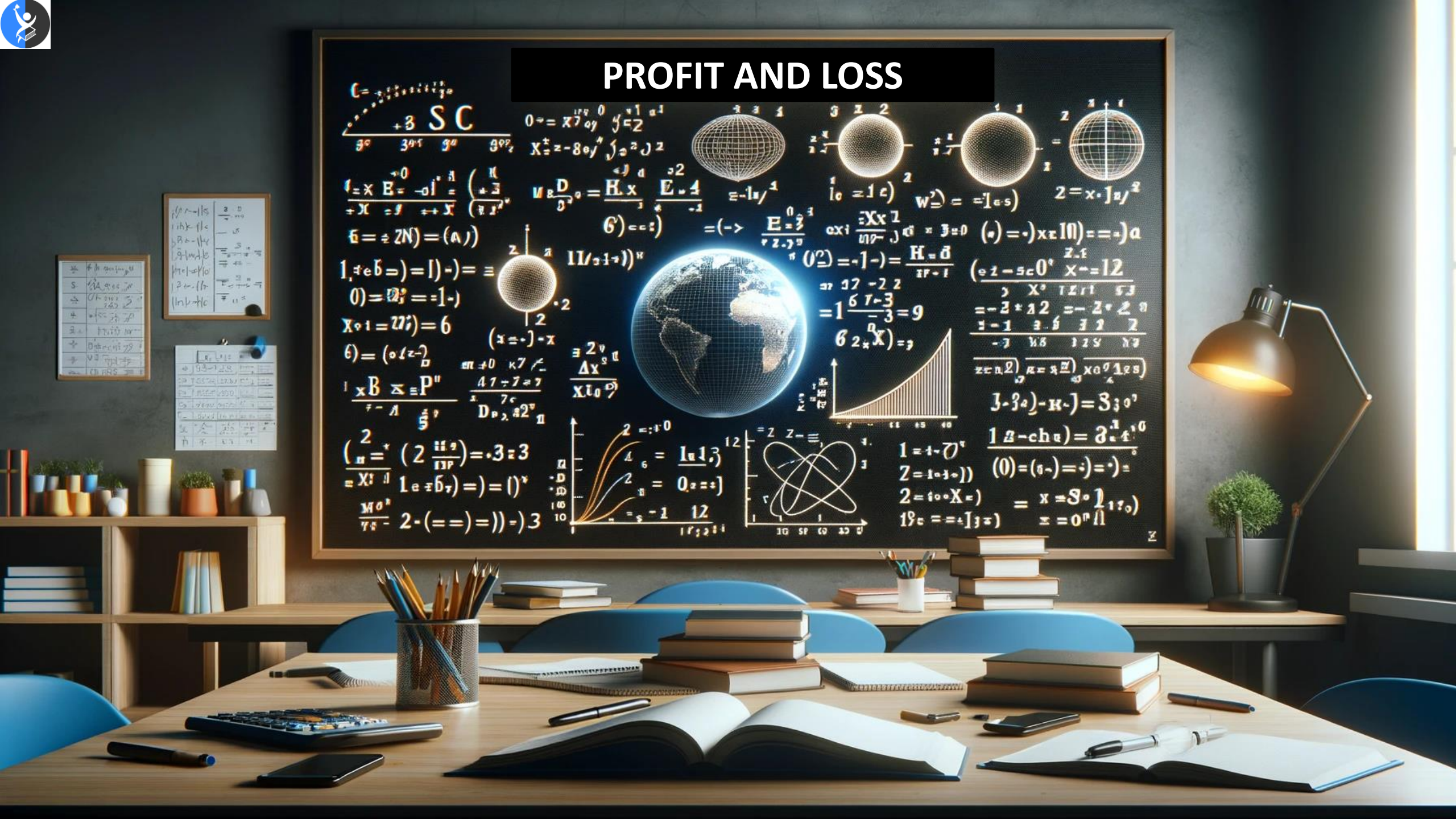
100 → 120

Profit

100 → 70

Loss of 30 ₹

PROFIT AND LOSS



What is profit-loss ?

Cost Price: (CP) (क्रय मूल्य)

The price at which an article is purchased is called its cost price (C.P.)

Selling Price: (SP) (विक्रय मूल्य)

The price at which the article is sold is called its selling price (S.P.)

Profit and Loss: Basic Terms

Profit:

When the selling price is more than the cost price then it is called profit

SP > CP

Profit = SP − CP

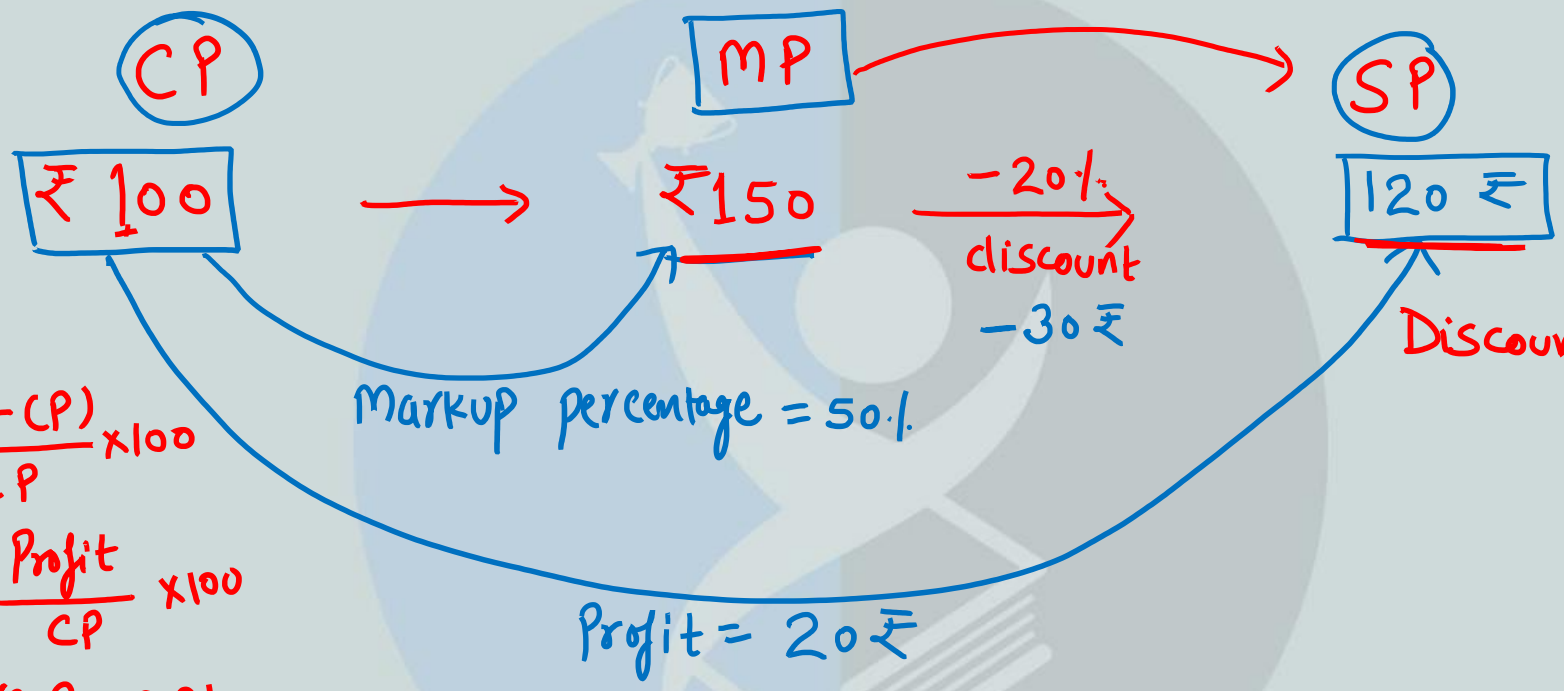
Loss:

When the selling price is less than the cost price then it is called loss.

SP < CP

Loss = CP − SP

Marked Price or List Price (MP or LP) and Discount



$$\text{Profit}(\%) = \frac{(SP-CP)}{CP} \times 100$$

$$\Rightarrow \frac{\text{Profit}}{CP} \times 100$$

$$\text{Loss}(\%) = \frac{(CP-SP)}{CP} \times 100$$

$$\Rightarrow \frac{\text{loss}}{CP} \times 100$$

$$\text{Discount}(\%) = \frac{(MP-SP)}{MP} \times 100$$

Marked Price or List Price (MP or LP) and Discount

Successive discount

Back to Back

MP → Cash → Pay

1000 $\xrightarrow{-10\%}$ −100 ₹ → 900 $\xrightarrow{-10\%}$ −90 ₹ → 810 ₹

$$1000 \times \frac{90}{100} \times \frac{90}{100} = 810\ ₹$$

Eg. An article is bought for Rs. 675 and sold for Rs. 900. Find the gain percent?

CP

SP

$$\text{Gain}(\%) = \frac{SP - CP}{CP} \times 100 = \frac{(900 - 675)}{675} \times 100$$

$$= \frac{225}{27} \times 4$$

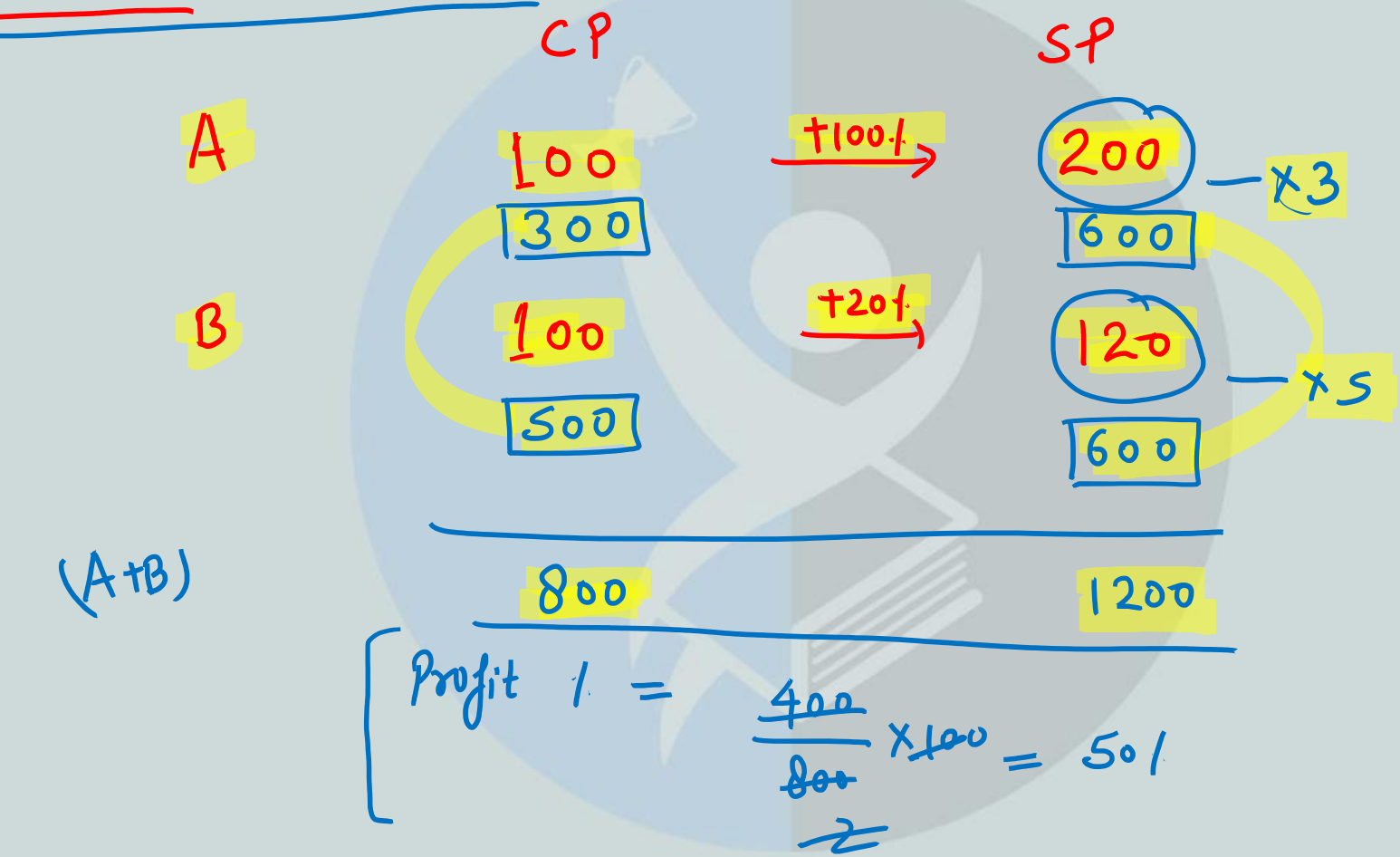
$$= \frac{100}{3} = 33\frac{1}{3}\%$$

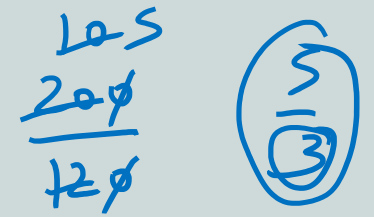
OR

3333%

Q1. Man sold article A at 100% profit and article B at 20% profit. If selling price of article A and article B is same then find his overall profit percentage

(a) 40%
(b) 50%
(c) 55%
(d) 60%





Q2. A shopkeeper sold an article at 33⅓% profit and another at 16 ⅔% loss. Find the overall profit or loss percentage if cost price of both the articles is same?

(a)5%
(b)10%
(c) 8⅓%
(d)12.5%

Profit $33\frac{1}{3}\% = \frac{1}{3}$ $\quad 16\frac{2}{3}\% = \frac{1}{6}$ (loss)

CP		SP
6 ✓	$\frac{1}{3}$ th → +2 ✓	8
+ 6	$\frac{1}{6}$ th → -1	+ 5
12	<	13

$$\text{Profit} = \frac{1}{3} \times 100 = \frac{25}{3} = 8\frac{1}{3}\%$$

Profit = SP − CP

Q3. CP of 10 article is equal to SP of 8 article. What percent of discount is given if MRP is 100% more than CP?

(a) 20%
(b) 37.5%
(c) 33.33%
(d) 25%

$10x = 8y$

$5x = 4y$

CP : SP = $\frac{x}{y} = \frac{4}{5}$

CP	MP	SP
4	8	5

4 → (100% markup) → 8 → (discount) → 5

Discount (%) = $\frac{MP - SP}{MP} \times 100 \Rightarrow \frac{8-5}{8} \times 100$

$= \frac{3}{2} \times 25 = \frac{75}{2} = 37.5\%$

Q4. Find the single discount equivalent to two successive discounts of 20% and 10%.

A. 25%
B. ~~26%~~
C. 28%
D. More than one of the above

20% → 80%
10% → 90%

MP → SP

$100 \times \frac{80}{100} \times \frac{90}{100} = 72$ ₹

100 → (−28%) → 72

Discount = MP − SP
100 − 72
28

Q5. What will be the single discount equivalent to two successive discounts of 25% and 24%?

A. 46%
B. 43%
C. 40%
D. 33%

25% → 75%
24% → 76%

MP = 100

$$100 \times \frac{3}{\cancel{100}} \times \frac{19}{\cancel{100}_{4}} = SP = 57$$

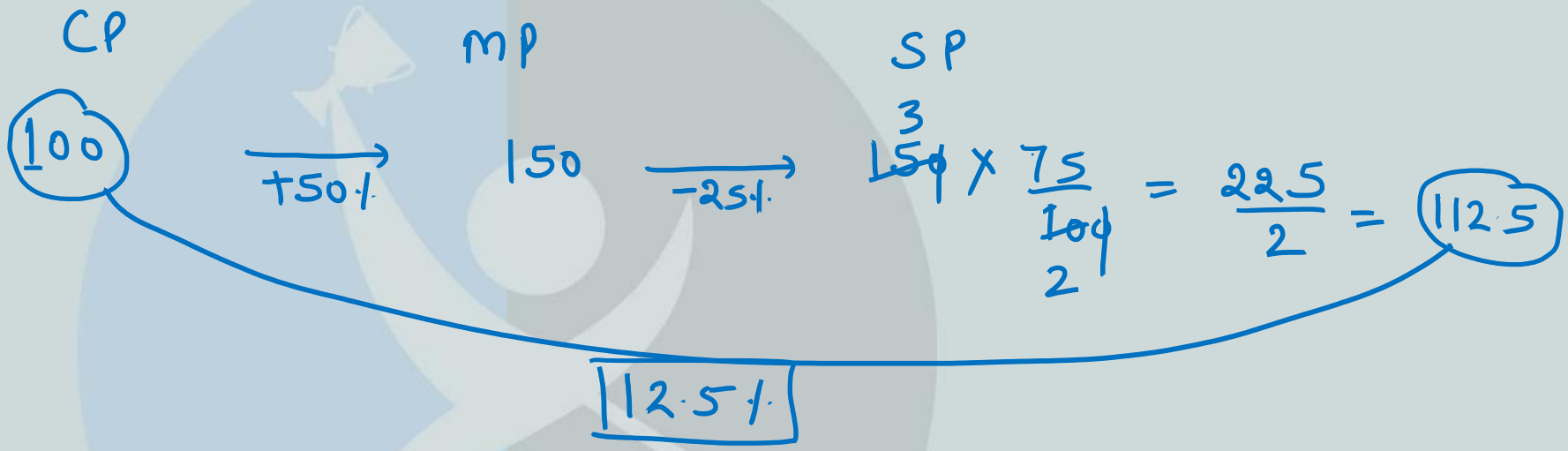
Discount = 100 − 57 = 43%

Q6. The percentage profit earned by selling an article for Rs. 1920 is equal to the percentage loss incurred by selling the same article for Rs. 1280. At what price should the article be sold to make 25% profit?

A. Rs. 2000
B. Rs. 2200
C. Rs. 2400
D. Data inadequate

Q7. A retailer marks all his goods at 50% above the cost price and thinking that he will still make 25% profit, offers a discount of 25% on the marked price. What is his actual profit on the sales?

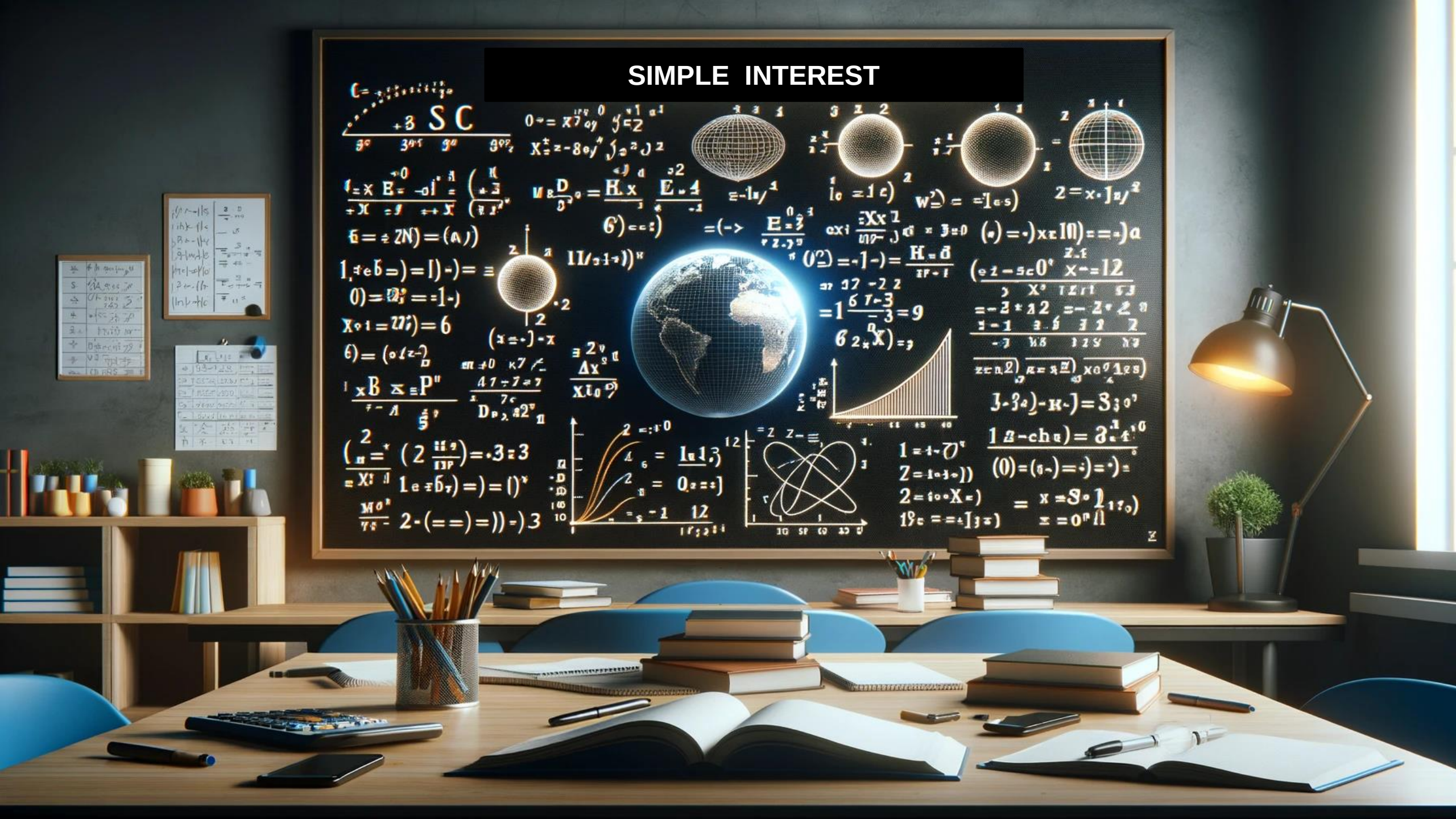
A - 10%
B - 12.50%
C - 11.50%
D - 12%



Q8. Akshay buys an article and markup it 30 % above its cost price. At the time of sale, he gives 10% discount instead of 15% due to which he earns Rs. 13 more. Find cost price.

(a) Rs. 230
(b) Rs. 150
(c) Rs. 130
(d) Rs. 200

SIMPLE INTEREST



SIMPLE INTEREST

Investing (P) = 1000 ₹

Rate of interest = 10% P.A.

t = 3 year

① ₹ 100

② ₹ 100

③ ₹ 100

₹ 300

Amount = (P + Interest)

A = (P + SI)

A = 1000 + 300

A = 1300 ₹

$$\text{Simple Interest} = \frac{P \times R \times t}{100}$$

(P → PA, t → years)

$$\boxed{\text{Amount} = P + SI}$$

P t R

Q1. A sum of Rs. 800 is lent for one year at a rate of 18% Per annum. Find the Simple interest charged on the sum. Amount.?

$$SI = \frac{P \cdot R \cdot t}{100} = \frac{800 \times 18 \times 1}{100} = 144 ₹$$

$$A = 800 + 144 = 944 ₹$$

Q2. A loan of Rs. 4000 (P) is lent for five (t) years at a rate of 15% (R) Per annum from a bank. Find the Amount which is to pay after 5 years to the bank.

$$SI = \frac{400 \times 15 \times 5}{100} = 40 \times 75 = 3000₹$$

$$A = P + SI$$

$$= 4000 + 3000 = 7000₹$$

Q3. If Rs 4000 becomes Rs 4800 in 2 years, what will Rs 6000 become at the end of 6 years at the same rate of interest under simple interest?

(1) Rs 9600 (2) Rs 9900 (3) Rs 10000 (4) Rs 10100

$SI = A - P = 4800 - 4000 = 800$ ₹

$SI = \frac{P \cdot R \cdot t}{100}$

$800 = \frac{4000 \times R \times 2}{100}$

$R = 10$ %

$P = 6000$

$t = 6$ years

$R = 10$ %

$SI = \frac{6000 \times 10 \times 6}{100} = 3600$ ₹

$A = 6000 + 3600 = 9600$ ₹

Q4. An amount of Rs. 20000 when invested at R% simple interest for 2 years becomes Rs. 24000. What will it become in 3 years if invested at (R+2)%? (in Rs.)

(a) 27200
(b) 26300
(c) 25200
(d) 27400

$P = 20000$ ₹
$R = R\%$
$t = 2$ years
$A = 24000$

$SI = 24000 - 20000 = 4000$

$\frac{4000}{2010} = \frac{20000 \times R \times 2}{100}$

$R = 10\%$

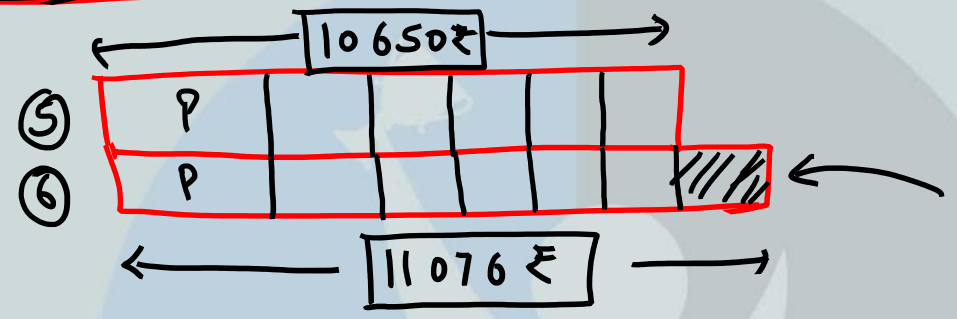
$P = 20000$ ₹
$t = 3$ years
$R = (R+2)\% = (10+2)\% = 12\%$

$SI = \frac{20000 \times 12 \times 3}{100} = 7200$ ₹

$A = 20000 + 7200 = 27200$ ₹

Q5. A sum becomes Rs. 10650 in 5 years and Rs. 11076 in 6 years at simple interest. What is the sum?

a) Rs. 8946
b) Rs. 8740
c) Rs. 8520
d) Rs. 8800



SI of 1 year = 11076 − 10650 = 426 ₹

$A = P + SI$

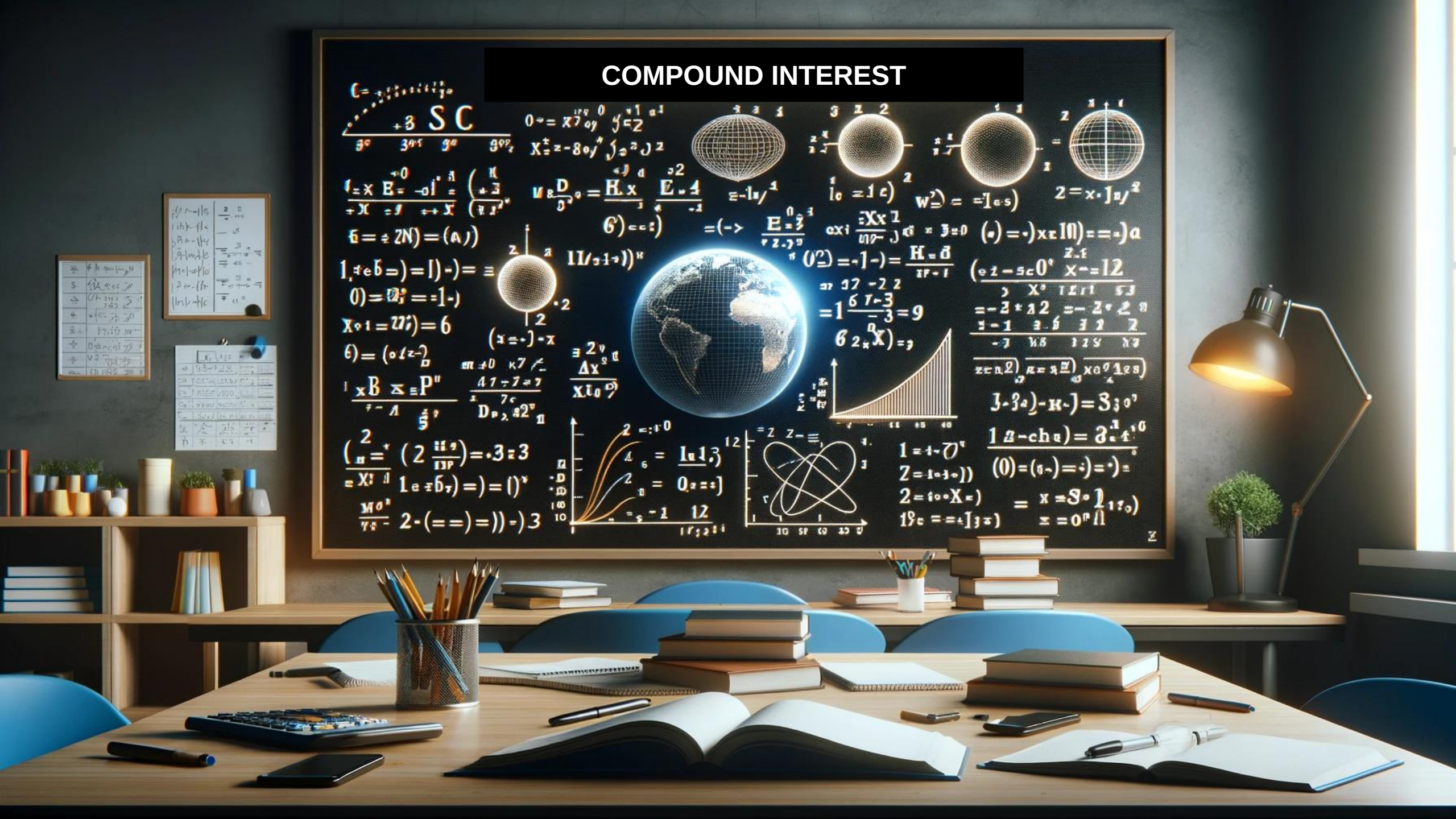
$10650 = P + (426 \times 5)$

$P = 10650 - 2130$

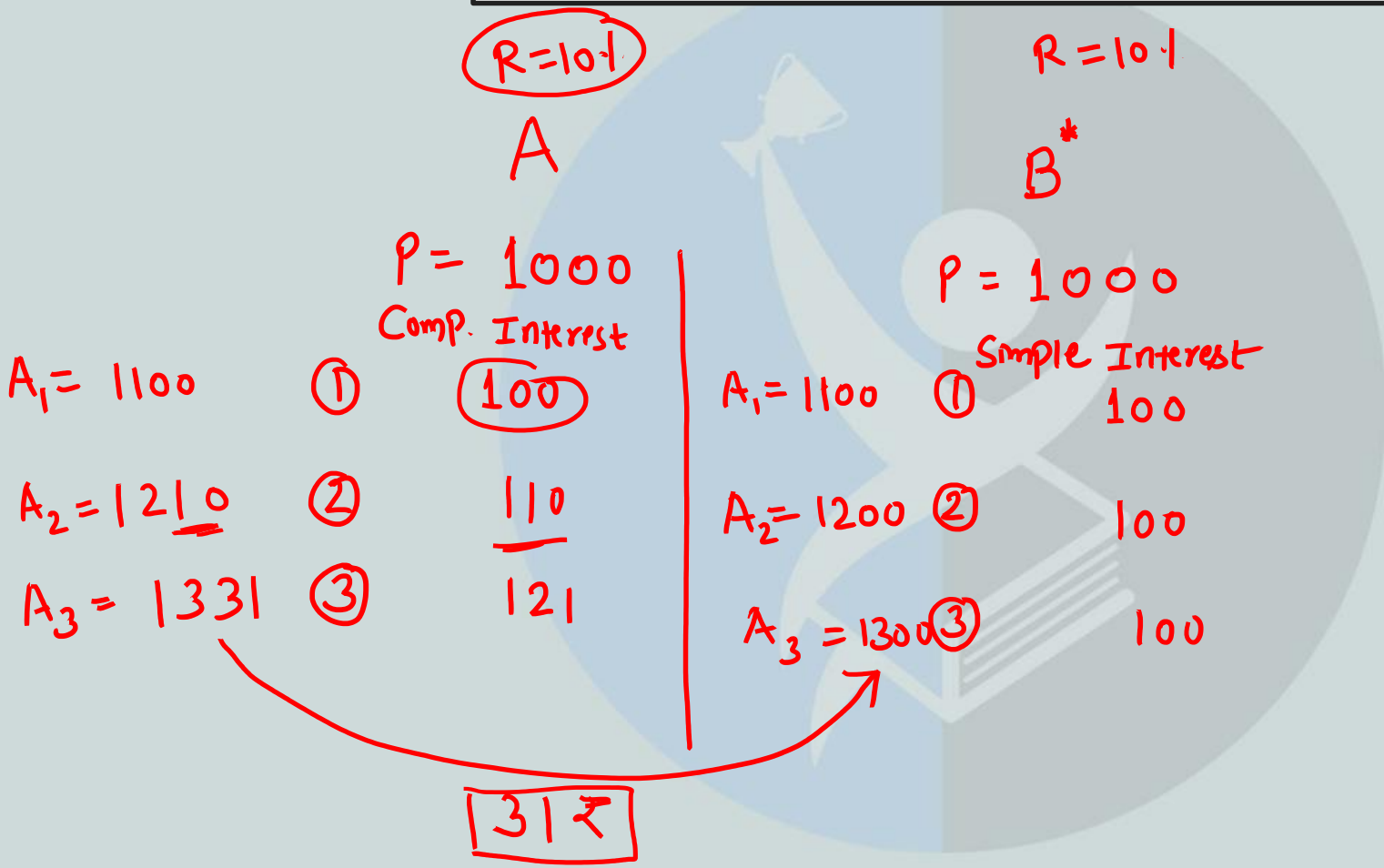
$P = 8520$ ₹

Q6. A sum of Rs. x was invested at 10% simple interest for 3 years. If the same sum was invested at 4% more for same period, then it would have fetched Rs. 120 more. Find the value of 5x. (in Rs.)

(a) 5000
(b) 4800
(c) 3600
(d) 5500


COMPOUND INTEREST

COMPOUND INTEREST



Compounded annually

Compounded half yearly

Compounded quarterly

COMPOUND INTEREST:

Amount ↑ $A = P\left(1 + \frac{r}{100}\right)^{n}$ ← Rate, → Time

where :

A = *total amount after n years*
P = *principal or original value*
r = *rate of interest per annum*
n = *number of years the money is invested*

$A = P + CI$

(For 2 years)

① $CI - SI = P\left(\frac{R}{100}\right)^2$ [in term of P and R]

and, $CI - SI = \frac{R \times SI}{2 \times 100}$ [in terms of SI and R]

(For 3 years)

② $CI - SI = P\left[\left(\frac{R}{100}\right)^3 + 3\left(\frac{R}{100}\right)^2\right]$

[in terms of P and R]

And, $CI - SI = \frac{SI}{3}\left[\left(\frac{R}{100}\right)^2 + 3\left(\frac{R}{100}\right)\right]$

[in terms of SI and R]

Q10. Find the compound interest (CI) on Rs. 10,000 for 2 years at 25% per annum compounded annually.

P t R

$$A = P\left[1 + \frac{R}{100}\right]^n$$

$$A = 10000\left[1 + \frac{25}{100}\right]^2$$

$$A = 10000\left[1 + \frac{1}{4}\right]^2$$

$$10000\left[\frac{5}{4}\right]^2$$

$$10000 \times \frac{25}{16} = \frac{25 \times 25 \times 25}{4} = \frac{625 \times 25}{4}$$

$$= 10000 \quad - 10000$$

$$15625 - 10000 \quad 5625$$

$$= 5625$$

R1.

① Int. 25 1. ✓

$25 \times \frac{25}{100} \; 4$

② 25 1. 6 25 1.

R1. = 50 + 6 25 = 5625 1.

$$CI = 10000 \times \frac{5625}{100} = 5625 ₹$$

Q11. A sum of Rs 1000 at 4% p.a. would become how much amount after 2 years by Compound Interest?

(1) Rs 1008 (2) Rs 1081.60 (3) Rs 1100 (4) Rs 1200

$A = P\left[1 + \frac{R}{100}\right]^n$

① 41.

② 41. 0.16

CI. = 8.16.

$4 \times \frac{4}{100} = 0.16$

R = 10%, Nt = 3 years

① 10.

② 10. 1.

③ 10. 2.1.

$CI = 1000 \times \frac{8.16}{100} = 81.6₹$

$A = 1000 + 81.6 = 1081.6₹$

Q12. Compound interest and simple interest on a certain sum for two years are Rs. 1100 and Rs. 1000 respectively. If rate of interest for both S.I. and C.I is 20% p.a., then find the sum.

(1) Rs. 2500
(2) Rs. 2000
(3) Rs.3000
(4) Rs. 1800

$$CI - SI = P\left(\frac{R}{100}\right)^2$$

$$1100 - 1000 = P\left(\frac{20}{100}\right)^2$$

$$100 = P\left[\frac{1}{25}\right]$$

$$P = 2500 ₹$$

Q13. The difference between simple and compound interests compounded annually on a certain sum of money for 2 years at 4% per annum is Rs 1. Find the sum

1) Rs 600
2) Rs 625
3) Rs 650
4) Rs 675

$$1 = P\left[\frac{4}{100}\right]^2$$

$$1 = \frac{P}{625}$$

$$\boxed{P = 625\ ₹}$$

Q14. The compound interest on a certain sum of money invested for 2 years at 5% per annum is Rs. 328. The simple interest on the sum, at the same rate and for the same period will be?

(1) 340
(2)320
(3)330
(4)390

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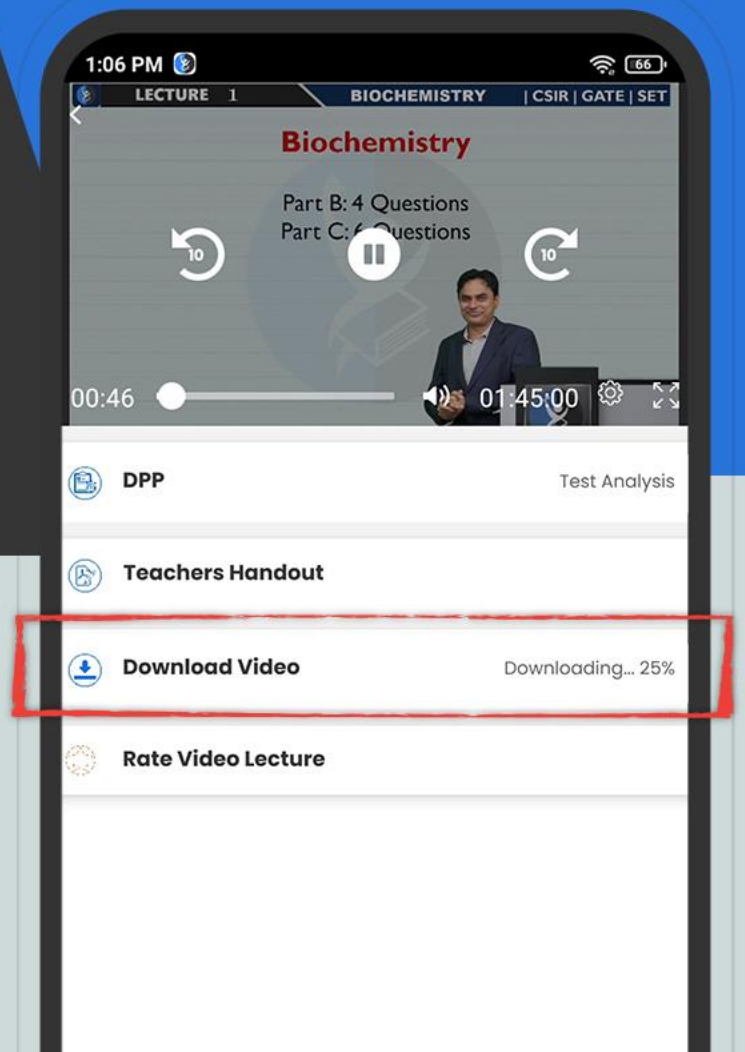

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